

Claims:

1. A filter adaptation unit suitable for producing a set of
5 filter coefficients, said filter adaptation unit
comprising:
- a) a first input for receiving a sequence of samples of a
first signal;
 - b) a second input for receiving a sequence of samples of
10 a second signal, the second signal including a certain
component which is correlated to the first signal;
 - c) a third input for receiving a first set of error
characterization data elements associated to a first
set of filter coefficients, the first set of filter
15 coefficients being such that when the first set of
filter coefficients is applied by an adaptive filter
on the first signal, a first estimate of the certain
component in the second signal is generated, the
certain component being correlated to the first
20 signal;
 - d) a coefficient generation unit operatively coupled to
said first input and said second input, said
coefficient generation unit being operative to
generate a second set of filter coefficients at least
25 in part on the basis of said first and second signals;
 - e) an error characterization unit operative for
processing the first signal and the second signal on
the basis of the second set of filter coefficients to
generate a second set of error characterization data
30 elements associated to the second set of filter
coefficients;
 - f) a selection unit for selecting one of said first set
of filter coefficients and said second set of filter

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coefficients at least in part on the basis of the first set of error characterization data elements and the second set of error characterization data elements;

- 5 g) an output for releasing a signal indicative of the set of filter coefficients selected by the selection unit.

2. A filter adaptation unit as defined in claim 1, wherein each error characterization data element in the second
10 set of error characterization data elements is associated to a respective frequency band selected from a set of frequency bands.

3. A filter adaptation unit as defined in claim 2, wherein
15 said error characterization unit is operative for:

- a) filtering the first signal on the basis of the second set of filter coefficients to derive a second estimate of the certain component in the second signal, the certain component being correlated to the first
20 signal;
- b) removing from the second signal the second estimate of the certain component to generate a noise signal;
- c) processing the noise signal and the first signal to generate the second set of error characterization data
25 elements.

4. A filter adaptation unit as defined in claim 3, wherein said error characterization unit is operative for:

- a) processing the first signal to derive a first set of
30 spectral values, each spectral value in said first set corresponding to a respective frequency band selected from a set of frequency bands;

- b) processing the noise signal to derive a second set of spectral values, each spectral value in said second set corresponding to a respective frequency band selected from the set of frequency bands;
- 5 c) generating the second set of error characterization data elements at least in part on the basis of the first set of spectral values and the second set of spectral values, each error characterization data element being associated to a respective frequency
- 10 band from the set of frequency bands.
5. A filter adaptation unit as defined in claim 4, wherein said coefficient generation unit is operative for applying a least squares method on the first and second
- 15 signals to derive the second set of filter coefficients.
6. A filter adaptation unit as defined in claim 5, wherein said error characterization unit is operative for computing a standard deviation data element for each
- 20 frequency band in the set of frequency bands on the basis of the first signal and the noise signal.
7. A method suitable for producing a set of filter coefficients suitable for use by an adaptive filter, said
- 25 method comprising:
- a) receiving a sequence of samples of a first signal;
- b) receiving a sequence of samples of a second signal, the second signal including a certain component which is correlated to the first signal;
- 30 c) providing a first set of error characterization data elements associated to a first set of filter coefficients, the first set of filter coefficients

being such that when the first set of filter coefficients is applied by an adaptive filter on the first signal, a first estimate of the certain component in the second signal is generated, the certain component being correlated to the first signal;

d) generating a second set of filter coefficients at least in part on the basis of said first and second signals, the second set of filter coefficients being such that when the second set of filter coefficients is applied by an adaptive filter on the first signal, a second estimate of the certain component in the second signal is generated, the certain component being correlated to the first signal;

e) processing the first signal and the second signal on the basis of the second set of filter coefficients to generate a second set of error characterization data elements associated to the second set of filter coefficients;

f) selecting one of said first set of filter coefficients and said second set of filter coefficients at least in part on the basis of the first set of error characterization data elements and the second set of error characterization data elements;

g) releasing a signal indicative of the set of filter coefficients selected in f).

8. A method as defined in claim 7, wherein each error characterization data element in the second set of error characterization data elements is associated to a respective frequency band selected from a set of frequency bands.

9. A method as defined in claim 8, wherein said method comprises:

- 5 a) filtering the first signal on the basis of the second set of filter coefficients to derive a second estimate of the certain component in the second signal, the certain component being correlated to the first signal;
- 10 b) removing from the second signal the second estimate of the certain component to generate a noise signal;
- c) processing the noise signal and the first signal to generate the second set of error characterization data elements.

15 10. A method as defined in claim 9, wherein said method
further comprises:

- a) processing the first signal to derive a first set of spectral values, each spectral value in said first set corresponding to a respective frequency band selected from a set of frequency bands;
- b) processing the noise signal to derive a second set of spectral values, each spectral value in said second set corresponding to a respective frequency band selected from the set of frequency bands;
- c) generating the second set of error characterization data elements at least in part on the basis of the first set of spectral values and the second set of spectral values, each error characterization data element being associated to a respective frequency band from the set of frequency bands.

11. A method as defined in claim 10, wherein said method comprises applying a least squares method on the first and second signals to derive the second set of filter coefficients.

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12. A method as defined in claim 11, wherein said method includes computing a standard deviation data element for each frequency band in the set of frequency bands between the first signal and the noise signal to derive the second set of error characterization data elements.

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13. A computer readable medium including a program element suitable for execution by a computing apparatus for producing a set of filter coefficients, the filter coefficients being suitable for use by an adaptive filter, said computing apparatus comprising:

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a) a memory unit;

b) a processor operatively connected to said memory unit,
said program element when executing on said processor
being operative for:

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i. receiving a sequence of samples of a first signal;

ii. receiving a sequence of samples of a second signal, the second signal including a certain component which is correlated to the first signal;

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iii. receiving a first set of error characterization data elements associated to a first set of filter coefficients, the first set of filter coefficients being such that when the first set of filter coefficients is applied by an adaptive filter on the first signal, a first estimate of the certain component in the second signal is generated, the

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certain component being correlated to the first signal;

- iv. generating a second set of filter coefficients at least in part on the basis of said first and second signals, the second set of filter coefficients being such that when the second set of filter coefficients is applied by an adaptive filter on the first signal, a second estimate of the certain component in the second signal is generated, the certain component being correlated to the first signal;
- v. processing the first signal and the second signal on the basis of the second set of filter coefficients to generate a second set of error characterization data elements associated to the second set of filter coefficients;
- vi. selecting one of said first set of filter coefficients and said second set of filter coefficients at least in part on the basis of the first set of error characterization data elements and the second set of error characterization data elements;
- vii. releasing a signal indicative of the set of filter coefficients selected in vi).

14. A computer readable medium as defined in claim 13, wherein each error characterization data element in the second set of error characterization data elements is associated to a respective frequency band selected from a set of frequency bands.

15. A computer readable medium as defined in claim 14, wherein said program element when executing on said processor being operative for:

- 5 a) filtering the first signal on the basis of the second set of filter coefficients to derive a second estimate of the certain component in the second signal, the certain component being correlated to the first signal;
- 10 b) removing from the second signal the second estimate of the certain component to generate a noise signal;
- c) processing the noise signal and the first signal to generate the second set of error characterization data elements.

15 16. A computer readable medium as defined in claim 15, wherein said program element when executing on said processor being operative for:

- 20 a) processing the first signal to derive a first set of spectral values, each spectral value in said first set corresponding to a respective frequency band selected from a set of frequency bands;
- b) processing the noise signal to derive a second set of spectral values, each spectral value in said second set corresponding to a respective frequency band selected from the set of frequency bands;
- 25 c) generating the second set of error characterization data elements at least in part on the basis of the first set of spectral values and the second set of spectral values, each error characterization data element being associated to a respective frequency band from the set of frequency bands.
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17. A computer readable medium as defined in claim 16,
wherein said program element when executing on said
processor being operative for applying a least squares
method on the first and second signals to derive the
5 second set of filter coefficients.

18. A computer readable medium as defined in claim 17,
wherein said program element when executing on said
processor being operative for computing a standard
10 deviation data element for each frequency band in the set
of frequency bands between the first signal and the noise
signal to derive the second set of error characterization
data elements.

19. An adaptive system comprising:
a) a first input for receiving a sequence of samples from
a first signal;
b) a second input for receiving a sequence of samples of
a second signal, the second signal including a certain
20 component which is correlated to the first signal;
c) a filter adaptation unit operatively coupled to said
first and second inputs, said filter adaptation unit
comprising:
i. a memory unit for storing a first set of error
25 characterization data elements associated to a first
set of filter coefficients, the first set of filter
coefficients being such that when the first set of
filter coefficients is applied by an adaptive filter
on the first signal, a first estimate of the certain
30 component in the second signal is generated, the
certain component being correlated to the first
signal;

- ii. a coefficient generation unit for generating a second set of filter coefficients at least in part on the basis of said first signal and second signal, the second set of filter coefficients being such that when the second set of filter coefficients is applied by an adaptive filter on the first signal a second estimate of the certain component in the second signal is generated, the certain component being correlated to the first signal;
- iii. an error characterization unit operative for processing the first signal and the second signal on the basis of the second set of filter coefficients to generate a second set of error characterization data elements associated to the second set of filter coefficients;
- iv. a selection unit for selecting one of said first set of filter coefficients and said second set of filter coefficients at least in part on the basis of the first set of error characterization data elements and the second set of error characterization data elements;
- v. an output for releasing a signal indicative of the set of filter coefficients selected by the selection unit;
- d) an adaptive filter operatively coupled to said first input and to the output of said filter adaptation unit, said adaptive filter being operative to apply a filtering operation to the first signal on the basis of the set of filter coefficients received from said filter adaptation unit to generate an estimate of the component in the second signal, the component being correlated to the first signal.

20. An echo cancellor comprising the adaptive system of claim 19.

5 21. A filter adaptation unit suitable for producing a set of filter coefficients, said filter adaptation unit comprising:

- a) means for receiving a sequence of samples of a first signal;
- 10 b) means for receiving a sequence of samples of a second signal, the second signal including a certain component which is correlated to the first signal;
- c) means for receiving a first set of error characterization data elements associated to a first set of filter coefficients, the first set of filter coefficients being such that when the first set of filter coefficients is applied by an adaptive filter on the first signal, a first estimate of the certain component in the second signal is generated, the
- 15 certain component being correlated to the first signal, each error characterization data element in the first set of error characterization data elements being associated to a respective frequency band selected from a set of frequency bands;
- 20 d) means for generating a second set of filter coefficients at least in part on the basis of said first and second signals, the second set of filter coefficients being such that when the second set of filter coefficients is applied by an adaptive filter on the first signal, a second estimate of the certain component in the second signal is generated, the
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certain component being correlated to the first signal;

- 5 e) means for processing the first signal and the second signal on the basis of the second set of filter coefficients to generate a second set of error characterization data elements associated to the second set of filter coefficients, each error characterization data element in the second set of error characterization data elements being associated to a respective frequency band selected from a set of frequency bands;
- 10 f) means for selecting one of said first set of filter coefficients and said second set of filter coefficients at least in part on the basis of the first set of error characterization data elements and the second set of error characterization data elements;
- 15 g) means for releasing a signal indicative of the set of filter coefficients selected by the selection unit.
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